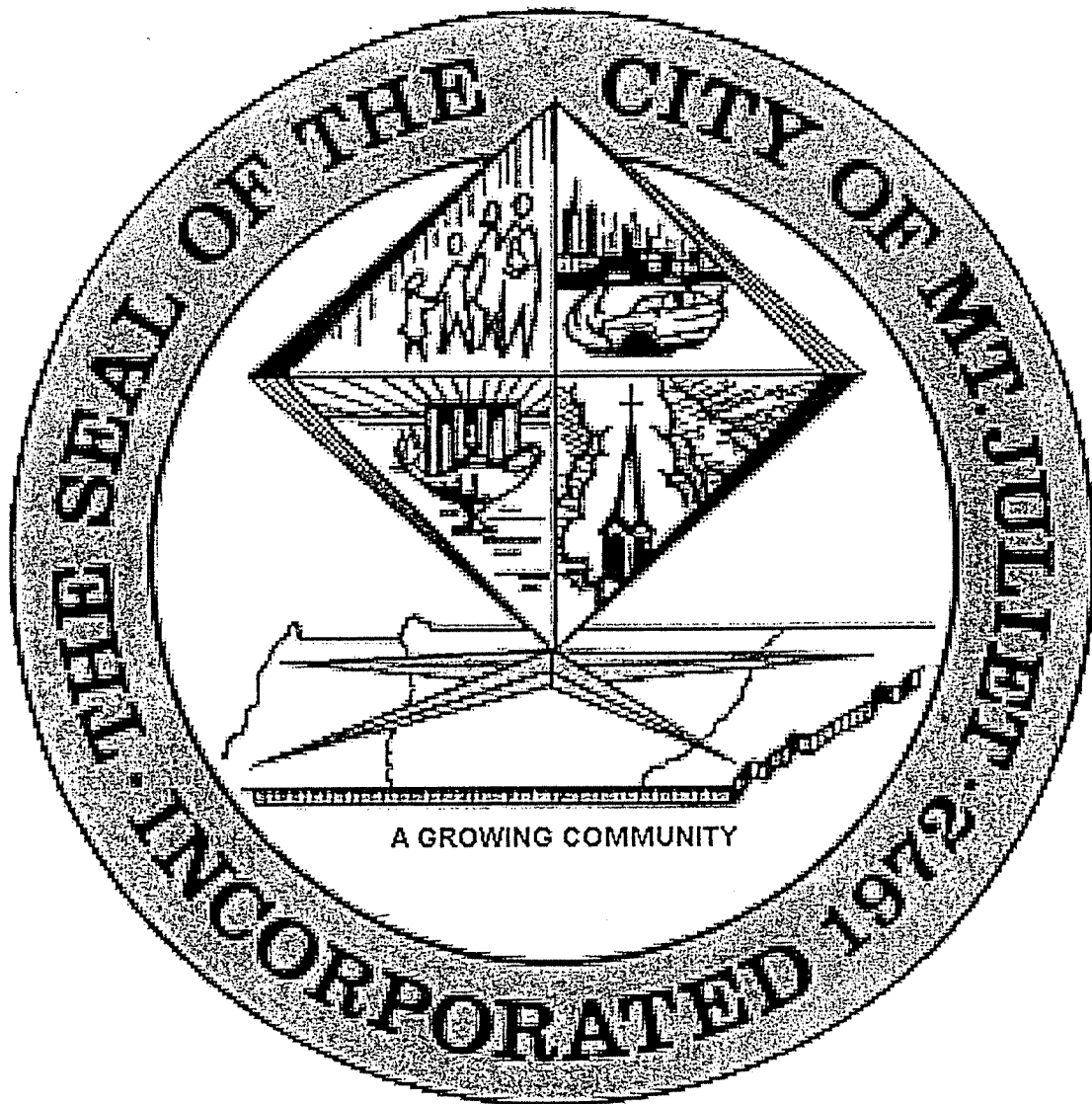


City of Mt. Juliet Stormwater Design Guidelines

Appendix C



JANUARY 2004

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Statement of Compliance

All activities under Chapter 1 through Chapter 5 of these Stormwater Design Guidelines shall be in compliance with the Small Municipal Separate Storm Sewer System, MS4 Phase II NPDES Permit TNS075451 issued February 27, 2003 and effective July 7, 2003 as set forth in Parts 1 through 7 of said permit, included in Appendix C.4 of this document.



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Chapter 1

STORMWATER MANAGEMENT POLICY

1.1 Objectives

The objectives of these regulations are:

1. To protect human life and health.
2. To minimize expenditure of public money for costly flood control projects.
3. To minimize the need for rescue and relief efforts associated with flooding.
4. To help maintain a stable tax base by providing for the sound use and development of flood-prone areas in such a manner as to maximize beneficial use without increasing flood hazard potential or diminishing the quality of the natural stormwater resources.
5. To ensure that potential homebuyers are notified that property is in a flood area and generally increase the public awareness of flooding potential.
6. To minimize prolonged business interruptions.
7. To minimize damage to public facilities and utilities such as water and gas mains; electric, telephone, and sewer lines; and streets and bridges located in flood plains.
8. To ensure a functional stormwater quantity and quality management system that will not result in excessive maintenance costs.
9. To encourage the use of natural and aesthetically pleasing design that maximizes preservation of natural areas.
10. To guide the construction of stormwater management facilities.
11. To protect or enhance stormwater quality to a level of "designated use" and minimize the impacts from new development or areas of significant redevelopment.



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12. To encourage preservation of flood plains, floodways, and open spaces to protect and benefit the communities quality of life and natural resources.

1.2 Policy Statements

To implement the objectives presented above, the following general policy statements shall apply:

1. Each project evaluation will determine if stormwater quantity and quality management practices can adequately serve the property and limit impacts to downstream public and private properties. The presence of a regional facility(s) will be considered in determining the extent to which quantity and/or controls will be necessary.
2. A system of uniform requirements shall be applied to each individual project site. In general, these uniform requirements will be based on the criterion that post-development stormwater peak runoff and water quality must not differ significantly from pre-development conditions. Additional requirements will be based on volume control for sites tributary to sinkholes or “drainage” wells.
3. No construction, whether by private or public action, shall be performed in a manner that will negatively impact stormwater quantity or quality in its vicinity or in other areas whether by flow restrictions, increased runoff, or by diminishing channel or overbank storage capacity.
4. New construction may not aggravate upstream or downstream flooding. Existing downstream or upstream problems may be required to be corrected in conjunction with new development.
5. Unwarranted acceleration of erosion due to various land development activities must be controlled.
6. New construction shall not be permitted until temporary or permanent erosion prevention and sedimentation control management practices have been placed or constructed and are operational to the City of Mt. Juliet’s satisfaction. Mt. Juliet reserves the right to stop construction on properties that do not have adequate erosion prevention and sedimentation control measures.



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7. New development will be required to minimize to impact to stormwater quality by applying structural and/or nonstructural management practices selected to address site-specific conditions.
8. Mt. Juliet reserves the right to require more stringent erosion prevention and sedimentation control practices on properties within sensitive (or impaired) watersheds proximate to "Waters of the State".
9. Mt. Juliet reserves the rights to require maintenance or modification of stormwater management practices that are not operating properly, as determined by the Department of Public Works.
10. For properties where stormwater quantity management practices are with not feasible or are not necessary in lieu of regional stormwater quantity controls, Mt. Juliet reserves the right to require on-site controls for stormwater quality.
11. Redevelopment of properties containing on-site stormwater management practices may be permitted by Mt. Juliet provided the property and downstream public and private properties, infrastructure or "Waters of the State" are adequately protected by a regional facility(s) from stormwater quantity or quality impacts.
12. Land disturbance activities will not be permitted within the floodway. Construction in flood plains should be done in a way that protects or enhances stormwater quality and promotes land and tree conservation, greenways, flood plains preservation and hazard mitigation.
13. Mt. Juliet reserves the right to require an "erosion prevention and sediment control professional" or other similar person designated by the Tennessee Department of Environment and Conservation (TDEC) to be on-site for inspection and enforcement of proper construction and maintenance of erosion prevention and sediment control management practices at a specific construction site.
14. The minimum diameter for all storm drains shall be 15 inches. Cross drains shall be a minimum of 18 inches.

1.3 Stormwater Management Systems

For the purposes of these regulations, stormwater management systems are considered to comprise two parts, the major and minor systems. A brief description of these two parts is presented below.



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1.3.1 Minor Systems

The minor system of a stormwater management network is sometimes termed the “initial system” and may consist of a variety of stormwater management appurtenances ranging from inlets, manholes, street gutters, roadside ditches, and swales to small channels or pipes. This system collects the initial stormwater runoff and conveys it to the major system.

1.3.2 Major Systems

The major system primarily consists of natural waterways, “Waters of the State,” large storm sewers, major culverts, bridges and large water impoundment’s, but it can also include less obvious flow paths such as overland relief swales and infrequent flood plain storage. The major system includes not only the trunk line conveyance that receives the water from the minor system, but also the natural flow path that functions in case of overflow from or failure of the minor system. Properly designed overflow relief will not flood or damage homes, businesses, or other property. It must always be remembered that the major system is needed for small, medium, and large flood events. Eventually, it will fill with water and flow whether or not it has been planned and designed, and whether or not development is situated wisely with respect to it.

1.4 Stormwater Quantity and Quality Detention

Increased urbanization within the City of Mt. Juliet has caused radical changes to the topography, ground cover, and minor stormwater management systems within each drainage basin. These changes have adverse effects on the environment, primarily through the subsequent increase in stormwater runoff quantity and non-point source pollution which impacts stormwater quality. In some areas, the combination of increased runoff and the location of property near a stream causes frequent flooding (often several times per year). In these areas, upstream control of frequent as well as large flows may not provide adequate flood protection for residents and property downstream.

To minimize adverse stormwater quantity and quality impacts, onsite detention of stormwater is mandatory for all developments that are not served by an adequately sized regional stormwater management facility, subject to review by the City of Mt. Juliet. Because detention in downstream areas of a large watershed can cause increase peak flows in downstream channels, the City of Mt. Juliet reserves the right to alter the detention criteria and to prohibit it where it would cause adverse impacts. This decision shall be based on sound engineering judgment along with supporting data and studies. The City of Mt. Juliet may also require or allow some type of in-stream mitigation measure in lieu of detention, where it can be shown that such measures are of equal or greater benefit. Nevertheless, in all cases where detention facilities are required, the



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location and design must comply with any stormwater master plans that may have been adopted.

This policy is primarily concerned with maintaining pre-development conditions, for stormwater quality, flood storage, flow and velocity; it should also be applied under certain conditions for the purpose of maintaining adequate capacity of an existing outfall or combining public and private efforts to correct existing deficiencies for flooding, erosion and stormwater quality. In some cases controlling the total volume of runoff to predevelopment levels may also be required, such as area tributary to sink holes.

1.5 Other Stormwater Quality Management Practices

Increased pollutant concentrations and loads impact the ability of the major systems and “Waters of the State” to meet designated use goals. In many cases, the designated use goal for creeks and streams in Mt. Juliet are fishability and swimability. To minimize these stormwater quality impacts, onsite stormwater quality management practices are mandatory for all developments subject to review by the City of Mt. Juliet.

The extent and type of management practices implemented must be proportionate to the land use, pollutant discharge potential and proximity to regional stormwater quality management practices. Mt. Juliet encourages that a series of best management practices be implemented that optimize the use of required green and open spaces, especially along buildings and within or along parking lots. The stormwater controls must be designed to limit the discharge of stormwater pollutants offsite to pre-development levels to the maximum extent practicable (MEP).

1.6 Flood Plains

Development of property located within the flood plain must comply with the guidelines established by the City of Mt. Juliet. Wise use of the flood plain is encouraged to minimize adverse effects on flood heights, flow velocities and stormwater quality, as well as maximize land conservation, greenways, flood plain preservation, and hazard mitigation. Buffers are required in and proximate to approved floodways and blue line streams.

Areas of the flood plain available for development must be protected through the use of compacted fill, elevated structures, dikes, or floodwalls. Any use of these measures must be in accordance with these requirements. Other flood proofing measures are subject to the approval of the City of Mt. Juliet.



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1.7 Erosion and Sediment Control

All development shall be conducted in a manner that minimizes soil erosion and resulting sedimentation. Under no circumstances is construction to allow sediments to leave a construction site in a way that would be a violation of the site or a violation of the requirements of the City of Mt. Juliet. Site-specific variables such as topography, soil erodibility, stormwater management features, and vegetation shall be considered when developing an erosion control plan. The exposed area of any disturbed land shall be limited to the smallest practical area for the shortest possible period of time. New developments and areas of significant redevelopment shall be required to fulfill the provision in Section 5.10 of this volume. This includes the requirement that sediment detention traps shall be required at the fringes of clearing along with silt fences, berms and /or straw bales as appropriate. The detention shall be sized to control runoff and silt for the duration of the project.



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Chapter 2

ADMINISTRATION

2.1 Enforcement

2.1.1 Right of Entry

The Director of Public Works, the Zoning Administration, or any of their duly authorized representatives may enter upon the premises of any land within the City of Mt. Juliet for the purposes of inspecting the site before, during, and after construction to determine compliance with these regulations.

The Director of Public Works or any of their duly authorized representatives may enter upon the premises of any land and enter facilities within the City of Mt. Juliet for the purposes of inspecting potential impacts of stormwater quality or any activities that may violate the requirements herein set forth.

2.1.2 Revocation

The Director of Public Works may revoke any approval or permit issued under the provisions of these regulations when informed of any false statement or misrepresentation of facts in the application of plans on which the permit or approval was based.

2.1.3 Corrective Measures

Any non-permitted stormwater management system, or construction, or fill located within a flood plain shall, upon written notice from the Director of Public Works, be removed at the expense of the property owner.

2.1.4 Stop Work Order

When it is found that any provisions of this regulation are being violated, the Director of Public Works or the Zoning Administration/Codes may issue a stop work order.

The stop work order shall be in writing and shall be served upon the owner of the business or property violating the provision, the duly authorized agent, or the person responsible for such work; or posting of the stop work order at the site of the violation or noncompliance.



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The stop work order shall set forth the following:

1. The reasons why such work is being stopped;
2. The regulations which is being violated;
3. The conditions under which the order may be removed and the work resumed;
and
4. The right to an appeal before the issuing Director.

A hearing to appeal the stop work order may be requested by anyone upon whom a stop work order has been served. An appeal must be requested in writing to the issuing Director within ten (10) days of service of the stop work order. The issuing Director shall hold an appeal hearing within fifteen (15) days of receipt of the appeal. At this hearing the issuing Director shall determine which provisions of the City of Mt. Juliet regulations is being violated and the condition under which the order may be removed and the work resumed. The hearing shall be informal; shall be scheduled by the issuing Director, and may be continued only with their consent. A written decision shall be mailed to the owner of the business or property within five (5) business days of the conclusion of the appeal hearing. The issuing Director's decision shall be final.

If no appeal is requested within ten (10) days of service of the stop work order, the stop work order shall remain in effect until compliance with the appropriate regulation or code section can be demonstrated to the satisfaction of the issuing Director. A compliance hearing to demonstrate that the business or work is in compliance with the relevant regulation or codes section may be requested at any time after issuance of the stop work order. The issuing Director shall schedule such a hearing ten (10) business days of receiving the request. Compliance hearings shall be conducted in the same manner as appeal hearings.

2.1.5 Penalties and Injunctions

Any violation of these regulations shall be punishable by a civil penalty not to exceed Five Hundred Dollars (\$500) per violation. Each day that a violation is not corrected shall be a separate offense.

In addition to all other remedies provided by law, the City of Mt. Juliet shall have the right to injunctive relief for any violation of these regulations.

2.2 Inspections

The City of Mt. Juliet, DPW may make or cause to be made the inspections required by this section. Reports by inspectors employed by recognized inspection services might be accepted provided that, after investigation, their qualifications and reliability prove



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satisfactory. No certificate called for by any provision of these regulations shall be based on such reports unless the same are in writing and certified by a responsible officer of such service.

2.2.1 Permitting

Before the Department of Codes Administration issues a building permit, the City of Mt. Juliet, DPW may examine or cause to be examined any tract of land for which an application has been received. The City of Mt. Juliet, DPW may also examine or cause to be examined any tract of land for which a grading permit application has been received.

2.2.2 Construction

The City of Mt. Juliet, DPW shall inspect or cause to be inspected at various intervals all construction or grading for which a building permit or grading permit has been issued, and a final inspection or waiver thereof shall be made of the tract of land upon completion.

Upon notification from the permittee or his agent, inspections of the tract of land shall be performed at the following times, as well as such other inspections as may be necessary.

1. Prior to the initiation of the project after temporary or permanent erosion prevention and sediment control practices have been installed.
2. After the completion of the rough grading and installation of stormwater management structures.
3. Upon completion of the project.

The Mt. Juliet Department of Public Works shall either approve that portion of the construction or grading as completed or shall notify the permittee or his agent where violations are noted.

Work shall not be done on any part of the tract of land beyond the point of indication in each successive inspection without first obtaining approval from the Mt. Juliet Department of Public Works. In particular, construction may not proceed until the site has been inspected to ensure that adequately sized temporary or permanent erosion prevention and sediment control practices have been installed and are operational for grading activities.



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2.3 As-Built Certifications

Prior to the issuance of a use and occupancy permit for any structure in a development, a Tennessee registered engineer shall submit to the City Engineer certification that the stormwater management system (both public and private) and the public road system is complete and functional in accordance with the plans approved by the City Engineer. Any deviations from the approved plans shall be noted on as-built drawings submitted. To insure the adequacy of stormwater quantity detention facilities and stormwater quality management practices, this certification shall, at a minimum include as-built drawings showing final topographic features of all these facilities. This shall include invert elevations of outlet control structures. Hydrologic and hydraulic calculations may be required for as-built conditions.

Prior to the issuance of a use and occupancy permit for any new or substantially improved structure that is subject to minimum floor elevation requirements, a registered engineer and/or registered land surveyor shall submit to the City Engineer certification of the elevation (in relation to mean sea level) of the lowest floor (including basement); or if the structure has been flood proofed, the elevation (in relation to mean sea level) to which the structure was flood proofed. This information must be provided on a FEMA Elevation Certificate. To ensure that flood plain cut and fill balances have been achieved, as-built plans, cross-sections, and related calculations must be submitted for all flood plain manipulations.



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Chapter 3

PERMITTING PROCEDURES

3.1 Overview

This chapter explains the procedure for applying for permits for building or grading and the process by which the City of Mt. Juliet reviews permits. Responsibilities of the applicant for posting permits, maintaining compliance with regulations, meeting time limits, and obtaining other required federal and state permits are also discussed.

3.2 Application Preparation

3.2.1 Preapplication Conference

All applicants may schedule a preapplication conference with the City Engineer to discuss their proposed project. While not mandatory, a preapplication conference is strongly encouraged to assure timely permit application preparation and review. This conference should be used to determine if a proposed project qualifies for exemption and to determine how technical guidelines and criteria should be applied.

3.2.2 Required Information and Checklist

Each application for a grading permit for property of a size requiring a permit shall be accompanied by a certification that a Notice of Intent (NOI) has been submitted to TDEC for a Tennessee General Storm Water Permit or certification that a permit is not required. The review of the plans will proceed if the certification indicates that the applicant will submit the permit number at a later date. If the site requires a Tennessee General Storm Water Permit the permit number must be submitted to the City Engineer before a grading permit is issued. This certification is presented in Appendix C.2.

Each application for a grading permit or a building permit referred to the City Engineer shall contain site preparation plans certified by a registered engineer, landscape architect, or land surveyor, as appropriate. The plans shall indicate whether or not the tract will be developed in stages and timing schedules shall be included when appropriate. In particular, site preparation plans shall include grading, drainage, and erosion control plans with appropriate plan and profile sheets for proposed streets or roads and details of the stormwater quantity and quality management systems.



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An application checklist is provided in Appendix C.1, to assist the applicant to prepare a complete application package and thereby ensure a timely review. The applicant shall attach a signed copy of the checklist with the application to certify that a complete package is being submitted. The checklist includes a requirement that the applicant be aware that certain land disturbance activities that will impact “Waters of the State”, “Wetlands”, and/or “Sinkholes” may be required to meet certain State and Federal regulations. It is the responsibility of the applicant to seek out and obtain any applicable State and Federal permits, prior to the initiation of any land disturbance activities.

Some requirements of the checklist will not be applicable to all projects, depending on the permit being requested. These should be checked as not applicable. Omissions of any required items shall render the plans incomplete, and they shall be returned to the applicant, or his engineer, for additional information.

3.2.3 Grading, Drainage, and Erosion Control Plans

The grading, drainage, and erosion control plans shall be of quality suitable for reproduction by electronic scanning or microfilm, and shall include as a minimum all of the following:

1. A complete plan of the proposed development at a scale no less than 1” (one inch)=100’ (one hundred feet). This plan is to include existing and proposed contours at intervals no greater than 2’ (two feet) (NGVD to be used exclusively). Contours shall extend to the centerline of all roads bordering the site. Where a stormwater management system ultimately enters the groundwater via a sinkhole or drainage well, the sinkhole or drainage well tributary area shall be delineated. At a minimum, the tributary area shall be delineated on a USGS 1:24000 quadrangle map to show basin wide contours. Preferably, the City of Mt. Juliet basemap data will be used to delineate and present the tributary area.
2. Existing and proposed buildings on the property.
3. Existing and proposed impervious surfaces, including calculations of directly connected impervious area (DCIA) versus non-DCIA.
4. Proposed and existing stormwater management structures, including inlets, catch basins, junction boxes, drive pipes, culverts, cross drains, headwalls, stormwater quality infrastructure or devices and outlet facilities, with size, type, slope, invert elevations, and quantity indicated.
5. Hydrologic, hydraulic, and stormwater quality calculations for appropriate design conditions and facilities.



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6. Stormwater quantity detention pond control structure details including multiple stage components for stormwater quality. If the pond is overtopped by the 100-year storm, include the emergency overflow.
7. Any proposed swales, ditches, or proposed modifications to existing ditches, with typical sections and limits of changes indicated.
8. Calculations and details for sizing stormwater quality management practices including, but not limited to detention, pretreatment swales and other appropriate practices.
9. Any high water or flood lines, either calculated or observed in the vicinity of the proposed development, and the source of said line or elevation indicated.
10. All fill areas indicated as such, with the limits and elevation indicated.
11. At least one benchmark located, with the proper elevation indicated (NGVD to be used exclusively).
12. The location, sized and capacity of the two-stormwater management structures immediately downstream of the proposed development in every direction that will receive runoff. This may be shown on a vicinity map with a scale no less than 1" (one inch)=2000' (two thousand feet).
13. Arrows indicating the existing and proposed direction of runoff throughout the plan.
14. Invert and top of grate elevations on all catch basins and inlets in addition to flow line elevations, stations, and percent grades of all cross drains and pipe between inlets and catch basins. Inlets should be sized to match pipe capacity.
15. Flood plain areas require the following information: existing and proposed flood plain and floodway boundaries along with flood plain elevations, cut and fill cross sections and volume calculations and lowest floor elevations for buildings in the flood plain. No credit will be given for cut below the 2-year flood elevation. Hydraulic calculations should be submitted, as appropriate.
16. Temporary erosion and sediment control measures to be implemented during construction including but not limited to temporary sediment basins, outlet protection devices, temporary seeding, mulching, geotextiles, straw bales, silt fences, etc.



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17. Final stabilization measures proposed for all disturbed areas on the property. Areas with slopes 3:1 or greater shall be stabilized with soil bioengineering techniques, “green” engineering techniques or by other methods approved by the City Engineer. Riprap may be used provided calculations are presented to the City Engineer that illustrate that soil bioengineering or “green” engineering techniques are either not cost-effective for the site or not feasible. Show stabilization for each ditch.
18. Plans shall include the maintenance activities and expected minimum frequency required for each type of temporary erosion prevention and sediment control management practice. The details shall present information to indicate when the management practices need to be maintained or replaced without the need to be notified by the City of Mt. Juliet, DPW.
19. Where special structures such as box culverts, bridges, or junction boxes are proposed detailed plans showing dimensions, reinforcement, spacing, sections, elevations, and other pertinent information shall be submitted.
20. Delineation of wetlands, stream buffer zones, or other environmentally sensitive areas.
21. Plans and calculations shall be signed and sealed by a registered engineer, landscape architect, and/or land surveyor, if application is for a grading permit. If application is for a building permit, they shall be signed and sealed by a registered engineer. All plans requiring engineering calculations (e.g., subsurface stormwater management design) shall be signed and sealed by registered engineer.

Omissions of any of the above requirements for detailed plans and calculations shall render the application incomplete, and it will be returned to the applicant, or his engineer, for additional information.

3.2.4 Street Plan and Profile Sheets

Streets shall be designed in accordance with the current edition of the City of Mt. Juliet Subdivision Regulations requirements and contained herein. Street plan and profile sheets shall include as a minimum all of the following:

1. Detail plans plotted on plan and profile sheets to a minimum scale of 1” (one inch)=100’ (one hundred feet) horizontal and 1” (one inch)=10’ (ten feet) vertical.



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2. Plan section including the street and right of way plotted to the proper scale with stationing shown, which should match that of the profile section as nearly as possible.
3. Where ditch section roadways are used, the type of stabilization required for the roadside ditches.
4. Typical roadway sections including pavement design details, as appropriate.
5. Profile sections plotted to the same scale as identified above and including the proposed centerline finish grade profile, in addition to the existing centerline profile.
6. Existing ground profiles at the centerline and the edge of the right-of-way.
7. All vertical control points on or pertaining to the proposed centerline profile such as P.V.C., P.V.I., and P.V.T.; all low points and street intersections as to station and elevation.
8. All percent grades and vertical curve data, both balanced and unbalanced.
9. Centerline finished grade elevations every 50' (fifty feet) to the nearest hundredth of a foot, at the bottom of the profile sheet.
10. Delineation of wetlands, stream buffer zones, or other environmentally sensitive areas.
11. Plan and profile sheets shall be signed and sealed by a registered engineer.

3.2.5 Sinkhole and Drainage Well Information

Because of the many stormwater management problems commonly associated with sinkholes and drainage wells, the applicant must provide the following information prior to the alteration of the natural flow patterns for watersheds discharging to such features.

1. Proposed onsite and offsite stormwater management channels that are tributary to a sinkhole throat or drainage well inlet shall be delineated, along with appropriate hydraulic calculations to define the existing and altered (if appropriate) 100-year flood plain and to confirm that offsite flooding will not be increased. Such plans and hydraulic calculations are to be certified by a registered engineer.



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2. Proposed stormwater quality management practices to be implemented above and beyond those that would be implemented on less sensitive sites. The details and accompanying calculations shall illustrate temporary and/or permanent controls.
3. Detailed contours are to be shown for all sinkholes that are to receive stormwater runoff from the site. These contours are to have a maximum interval of 2 feet and are to be verified by field surveys.
4. A geologic investigation of all sinkholes receiving stormwater runoff from the site shall be performed. The report from this investigation shall be certified by a registered engineer experienced in geology and groundwater hydrology and shall contain the following:
 - a. Location and nature of underground aquifers.
 - b. Direction of flow for the subsurface drainage associated with the sinkhole or drainage well.
 - c. Estimated safe discharge from sinkhole to aquifers. Include information on method of sinkhole discharge estimation.
 - d. Potential for siltation problems.
 - e. Foundation problems that may be expected around sinkhole.
 - f. Details of stormwater management structures to be built in sinkholes.
 - g. Any other factors relevant to the design of conveyance from sinkholes.
 - h. Plans showing the current and altered (if appropriate) 100-year flood.
 - i. Details of plan for grading and clearing of vegetation within the 100-year flood plain.
5. Compliance with any and all conditions that may be required by the federal government or the State of Tennessee shall be documented. The TDEC Division of Water Supply is the primary regulatory agency for drainage wells. Discharge into a sinkhole may require a permit for a Class V well under rules for Underground Injection Control (UIC).



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6. Demonstration that development will not occur within the area flooded by the 100-year flood. The 100-year elevation may be lowered by construction of a drainage well or detention pond. Calculations that document a lowering of the 100-year flood elevation shall be based on the 100-year, 24-hour storm using an appropriate safety factor for discharge into the sinkhole.

Multiple residential developments must be designed assuming total sinkhole or drainage well blockage. A surface outlet may be provided to prevent stormwater from rising above the 100-year flood elevation. No development will be allowed within the basin of a sinkhole if such development will lead to any additional increase in flood levels within that or adjacent basins. Special care will be required during construction to prevent eroded soil or debris from being washed into the sinkhole.

3.3 Application Process

Applications for building permits are made to the Department of Codes Administration. Applications for grading permits are made to the Mt. Juliet Regional Planning Commission.

3.3.1 Initial Receipt and Resubmittals

When referred to the City of Mt. Juliet, permit applications are logged in by date. A basic project information sheet and checklist must be completed in its entirety. Failure by the applicant to complete the basic information sheet and checklist on initial submission may result in a delay in the review of the proposed plans. The project information sheet is included in Appendix C.1. The checklist is included in Appendix C.2.

3.3.2 Staff Review

The City Engineer first conducts a sufficiency review of the permit applications to determine if all basic information has been included. A sufficiency review checklist similar to the application checklist presented in Appendix C.1 will be used for this purpose. Should the permit application be determined to be incomplete, the application will be returned to the applicant along with a request for any additional information.

When all basic information has been supplied, the City Engineer will log in the plans and conduct a technical evaluation of the permit application. This technical evaluation will be based on the technical criteria outlined in Chapter 5 of this volume.



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3.3.3 Staff Recommendation

If in the opinion of staff, the work described in the permit application, including drawings, conforms to the requirements of these regulations and other pertinent laws and ordinances, a grading permit shall be issued and a recommendation for approval shall be given to the Department of Codes Administration who may then issue a building permit.

However, if in the opinion of staff, the application, including the drawings, describes work that does not conform to the requirements of these regulations or other pertinent laws or ordinances staff shall not approve the application. The plans shall be stamped "returned for correction", shall be accompanied by written reasons, and returned to the applicant. The opinion of the City Engineer shall be based on the results of the sufficiency review and the technical evaluation.

3.3.4 Revisions to Approved Plans

Should prior to or during construction, changes be anticipated that would constitute a revision of the plans already approved by the City Engineer, the approved plans shall be revised and resubmitted in triplicate by a registered engineer. The resubmission shall include a letter stating why such changes are believed necessary for the approved plans, the grading permit and the completed basic project information form presented in Appendix C.1. The City of Mt. Juliet reserves the right to waive the requirement or to re-review the entire set of plans in the light of requested changes.

3.4 Construction Procedures

A person, firm, or corporation required to obtain a grading permit from the City of Mt. Juliet in compliance with these regulations must do so prior to commencing any work pertaining to the permit. Corrective measures including but not limited to stop work orders, penalties, and injunctions may be taken as required to enforce the terms of this requirement.

3.4.1 Posting of Permit

Work requiring a grading permit shall not be commenced until the permit holder or his agent shall have posted the grading permit card in a conspicuous place on the front of the premises. The permit shall be protected from the weather and be placed to allow easy access for recording entries. The permit card shall remain posted by the permit holder until the Department of Codes Administration has issued a use and occupancy permit.



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3.4.2 Effect of Permit

A grading permit issued pursuant to this section shall be construed to be a license to proceed with the work and shall not be construed as authority to violate, cancel, alter, or set aside any of the provisions of these regulations, nor shall issuance of a permit prevent the City of Mt. Juliet, DPW or the Department of Codes Administration from thereafter requiring a correction of errors in plans or in construction or of violations of these regulations.

3.4.3 Time Limits of Permit

Unless the work authorized by a grading permit is commenced within six (6) months after the date the permit was issued, the grading permit shall become invalid and a new permit shall be required. If the work, authorized by such permit is not completed in accordance with approved timing schedules, or twelve (12) months from the date of issuance the permit shall be invalid. However, for just and reasonable cause, one or more extensions for periods not exceeding thirty (30) days each may be allowed. Request for such extensions shall be submitted in writing to the City of Mt. Juliet, DPW and the Department of Codes Administration; authorization shall also be in writing.

3.5 Federal and State Permits

Approval by the City of Mt. Juliet does not relieve the applicant of responsibility for obtaining any permits required by the U.S. Army Corps of Engineers, Tennessee Division of Water Pollution Controls, Tennessee Division of Ground Water Protection, Region IV of the U.S. Environmental Protection Agency, or by any other federal or state agencies.

3.5.1 U.S. Army Corps of Engineers

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alteration of any navigable water of the United States unless the work has been previously authorized by the Department of Army (DA) permit. The construction of outfalls, stormwater management outlets, or other structures below ordinary high water of any navigable water will require a DA permit prior to construction.

Section 301 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States unless the work has been previously authorized by a permit pursuant to Section 404 of the same Act. Placements of dredged or fill material below ordinary high water of any water in conjunction with stormwater management



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improvements (e.g., channel realignments, concrete slope paving) will require a DA permit prior to construction. The placements of dredged or fill material or any grading activities within a wetland must also be in compliance with Section 404.

If a permit were required, approximately 60 days would normally be required for permit processing. Depending on the nature and location of the work, it is possible that the work has been previously approved under authority of the Nationwide Permit and individual procession would not be required.

3.5.2 Tennessee Division of Water Pollution Control

In accordance with the Tennessee Water Quality Control Act, T.C.A 69-3-108, any activity that alters the course or physical character of a stream, defined by a blue line on a 7-½ minute U.S.G.S. (United States Geological Survey) quadrangle, requires an Aquatic Resource Alteration Permit (ARAP). This permit is required for activities such as stream channelization, stream enlargement, dredging, and diversions in box culverts.

Section 405 of the Water Quality Act of 1987 (WCA) added Section 402(p) of the Clean Water Act (CWA) to require the Environment Protection Agency (EPA) to establish regulations setting forth National Pollutant Discharge Elimination (NPDES) permit application requirements.

Projects must be designed with sensitivity to stormwater quality issues and must comply with Section 405 as administered by the Tennessee Division of Water Pollution Control.



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Chapter 4

FLOOD PLAIN REQUIREMENTS

4.1 Zoning Ordinance

Uses permitted within the flood plain shall be in accordance with Article 8 of the Mt. Juliet Zoning Ordinance and as summarized in Sections 4.2 and 4.3 of this manual. The regulations and controls set forth shall be applied within the areas designed on the zoning map or on special overlays that are made a part of the Zoning Ordinance and may be viewed upon request at the office of the City Engineer. However, nothing contained herein shall prohibit the application of the Article 8 regulations to lands that can be demonstrated by competent engineering survey, using adopted profiles from which the flood protection elevation is derived, to lie within any flood plain. Conversely, any lands that can be demonstrated by competent engineering to lie beyond the flood plain shall not be subject to the Article 8 regulations. Any lands within the areas designated as flood plains on the zoning map or special overlays shall be subject to the regulations on controls pertaining to flood plains as set forth in this manual.

4.2 Base Flood and Floodway Data

All applications for proposed projects within areas of special flood hazard shall provide base flood elevations and floodway data to establish flood plain easements and lowest floor and fill elevations. Areas of special flood hazard along with base flood elevation and floodway data for many streams in the county are available from the Flood Insurance Rate Map (FIRM) and the City of Mt. Juliet map revision files. All proposed developments near streams shown to be special flood hazard areas must be designed in accordance with the provisions of these regulations.

If a project is located in an unnumbered A zone, the applicant shall provide base flood elevation and floodway data as documented in a Flood Plain Report when the project is greater than the lesser of 50 lots or 5 acres. In addition, a Flood Plain Report shall be required for areas outside unnumbered A zones, when the stream has a tributary area of one square mile or greater.

The Flood Plain Report shall consist of plan and profile data and water surface elevation calculations. The plan view shall show the flood plain water surface limits, flood plain easement lines, base line, cross section stations, and adjacent boundaries. The profile should show stream invert, cross section stations, and computed water surface elevations.



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The report should also show the topographic divides on the plan and the ultimate zoning categories used. Base flood elevation and floodway data submitted by the applicant for areas previously without such data or for areas not studied by FEMA, shall be reviewed by the City Engineer, and if acceptable, shall be processed for adoption as part of the official flood plain management data for these regulations. When the base flood elevation and floodway data submitted by the applicant results in deviation from the data developed by FEMA, such deviation shall become official following review and approval by both the City Engineer and FEMA.

4.3 General Standards

In all areas of special flood hazard, the following provisions are required:

1. New construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.
2. Manufactured homes shall be anchored to prevent flotation, collapse, or lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-op or frame ties to ground anchors. This standard shall be in accordance to and consistent with applicable state requirements for resisting wind forces.
3. New construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.
4. New construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.
5. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
6. New and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the system.
7. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the system into floodwaters.
8. Onsite waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.



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9. Any alteration, repair, reconstruction, or improvements to a structure that is in compliance with the provisions of these regulations shall meet the requirements of “new construction” as contained in these regulations.
10. Any alteration, repair, reconstruction, or improvements to a structure that is not in compliance with the provisions of these regulations shall be undertaken only if said non-conformity is not furthered, extended, or replaced.

4.4 Specific Standards

In all areas of special flood hazard where base flood elevation data have been provided, the provisions detailed below are required. It is the intent of the City of Mt. Juliet that all construction, whether within or adjacent to the delineated flood plains, shall be subject to the provisions of these regulations. As an example, all residential construction shall be elevated such that the lowest floor is not lower than 4 feet above the base flood elevation. Exceptions to this standard may be granted on appeal to the City Engineer based on a demonstration that the regulatory elevation is so conservative as to place an unreasonable burden upon the developers or property owners.

4.4.1 Residential Construction

New construction or substantial improvements of any residential structure (or manufactured home) shall have the lowest floor, including basement, elevated no lower than 4 feet above the base flood elevation. Should solid foundation perimeter walls be used to elevate a structure, openings sufficient to facilitate the unimpeded movements of floodwaters shall be provided in accordance with standards.

4.4.2 Standards for Manufactured Homes and Recreational Vehicles

Manufactured homes and recreational vehicles shall meet the following provisions:

1. All manufactured homes placed, or substantially improved, on individual lots or parcels, in expansions to existing manufactured home parks or subdivisions, or in substantially improved manufactured home parks or subdivisions, must meet all the requirements for new construction, including elevation and anchoring.
2. All manufactured homes placed or substantially improved in an existing manufactured home park or subdivision must be elevated so that:
 - a. The lowest floor of the manufactured home is elevated no lower than 4 feet above the base flood elevation.



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- b. Reinforced piers or other foundation elements of at least an equivalent strength, of no less than 36 inches in height above grade, support the manufactured home chassis.
 - c. The manufactured home must be securely anchored to the adequately anchored foundation system to resist flotation, collapse, and lateral movement.
 - d. In an existing manufactured home park or subdivision on which a manufactured home has incurred “substantial damage” as the result of a flood, any manufactured home placed or substantially improved must meet the standard for elevation and anchoring listed above.
3. All recreational vehicles placed on sites must either:
 - a. Be fully licensed and ready for highway use, that is, it must be on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices and has no permanently attached structures, or
 - b. The recreational vehicle must meet all requirements for new construction, including elevation and anchoring in items 1 and 2 above.

4.4.3 Non-Residential Construction

New construction or substantial improvements of any commercial, industrial, or non-residential structure (including manufactured structures) shall have the lowest flood, including basement, at least one foot above the level of the base flood elevation. Structures located in A and AE zones may be floodproofed in lieu of being elevated, provided that all areas of the structure below the required elevation are watertight, with walls substantially impermeable to the passage of water, and use structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered engineer or architect shall certify that these standards are satisfied.

4.4.4 Elevated Buildings

New construction or substantial improvements of elevated buildings that include fully enclosed areas formed by foundation and other exterior walls below the base flood elevation shall be designed to preclude finished living space. Design shall also allow for the entry and exit of floodwaters to automatically equalize hydrostatic flood forces on exterior walls. Designs for complying with this requirement must either be certified by a registered engineer or architect, or meet the following minimum criteria:

1. A minimum of two openings having a total net of not less than one square inch shall be provided for every square foot of enclosed area subject to flooding.



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2. The bottom of all openings shall be no higher than one foot above grade.
3. Openings shall be equipped with screens, louvers, valves, or other coverings or devices provided they permit the automatic flow of floodwaters in both directions.

Electrical, plumbing, and other utility connections are prohibited below the base flood elevation. Access to the enclosed areas shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be partitioned or finished into separate rooms.

4.4.5 Floodways

Areas designated as floodways are located within areas of special flood hazard. The floodway is an extremely hazardous area because of the velocity of floodwaters, which can carry debris and potential projectiles and have erosion potential. Floodways are also used as a base in determining the width of the required stream buffer as described in Section 4.9. Thus, the following provisions shall apply:

1. Encroachments, including fill, excavation, clearing, new construction, and other development, are prohibited unless certification (with supporting technical data) by a registered engineer is provided demonstrating that encroachments shall not result in any increase in flood levels during occurrence of the base flood discharge and a variance is granted by the City Engineer.
2. If Item 1 above is satisfied, all new construction shall comply with all applicable flood hazard reduction provisions of these regulations.
3. The placement of manufactured homes is prohibited except in an existing manufactured home park or subdivision. A replacement manufactured home may be placed on a lot in an existing manufactured home park or subdivision provided the anchoring, elevation, and encroachment standards of these regulations are met.

The open space uses listed below shall be permitted within the floodway to the extent that they are not prohibited in a particular area by any base-zoning ordinance and all applicable flood hazard reduction provisions of these regulations are met.



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1. Agricultural uses such as general farming, pasture, truck farming, forestry, sod farming, and wild crop harvesting.
2. Public and private recreational uses not requiring "permanent or temporary structures" designed for human habitation; some examples are parks, greenways, swimming areas, golf courses, driving ranges, picnic grounds, wildlife and nature preserves, game and skeet ranges, and hunting, fishing, and hiking areas. Temporary structures placed on a site for less than 180 consecutive days are not considered to be improved property.
3. Utility facilities such as flowage areas, transmission lines, pipelines, water monitoring devices, roadways, and bridges.

4.4.6 Flood Plain Alterations

All flood plain alterations that result in the filling or elimination of flood plain storage shall provide compensating storage capacity by dredging out at least an equal amount of volume as occupied by fill. All dredged or cut materials shall be removed from the site before fill materials can be delivered; unless all fill material is generated onsite.

Dredging or cut volumes below the elevation of the 2-year storm event shall not be included in the compensating storage capacity calculation. Every effort shall be made to preserve natural flow lines and to avoid situations that encourage sediment deposition in slack water areas.

All dredged or cut areas shall be stabilized immediately to prevent erosion. Areas to be filled must be cleared of standing trees, stumps, brush, down timber, and all objects including structures on and above the ground surface. Topsoil shall be removed and stockpiled, while other spoil materials must be disposed of offsite. Fill material obtained offsite shall not be stockpiled onsite before grading cuts are completed. Fill material shall be placed in compacted layers and the minimum distance from the perimeter of any proposed building to the top of the slope shall be either 25 feet or twice the depth of fill at that point, whichever is greater. The fill material must not have slopes equal to or greater than 3:1 unless stabilization measures approved by the City Engineer are installed. All slopes shall be stabilized.

No alterations can be made to the flood plain and stormwater management channels without the written approval of the City Engineer. All applicable requirements of these regulations and the following specific conditions must be met before such approval will be granted:

1. The construction of a levee, earth fill, building, or other structure that alters a flood plain area shall be permitted based on a plan prepared by a registered engineer, showing existing and proposed elevations, existing and proposed



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stormwater management channels, and existing and proposed structures. The City Engineer, certifying that the alteration and construction as proposed are in compliance with all applicable flood hazard reduction provisions of these regulations, shall approve the plan.

2. The same shall approve the proposed excavation, filling, or change of alignment of any existing channel under the jurisdiction of the U.S. Army Corps of Engineers.
3. The Mt. Juliet Regional Planning Commission shall approve the plan. Any duly approved alteration of the flood plain will be so noted on the official zoning map as a matter of information. The City Engineer will make this notation upon certification to the Planning Commission that such alteration has been completed in accordance with the approved plan.

4.4.7 Floodproofing

Floodproofing measures such as those identified below are acceptable provided they are certified by a registered engineer or architect as being consistent with the base flood conditions for the particular area, and that floodproofing criteria for non-residential construction in Section 4.4.3 are met.

1. Anchoring to resist flotation and lateral movement.
2. Installation of watertight doors, bulkheads, and shutters.
3. Reinforcement of walls to resist water pressures.
4. Use of paints, membranes, or mortars to reduce seepage of water through walls.
5. Addition of mass or weight to structure to resist flotation.
6. Installation of pumps to lower water levels in structures.
7. Construction of water supply and waste treatment systems to prevent the entrance of floodwaters.
8. Pumping facilities for subsurface stormwater management systems for buildings to relieve external foundation wall and basement floor pressures.
9. Construction to resist rupture or collapse caused by water pressure or flotation debris.
10. Cutoff valves on sewer lines or the elimination of gravity flow basement drains.



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4.5 Standard for Streams Without Established Base Flood Elevations and/or Floodway

It is the intent of the City of Mt. Juliet that all construction whether within or adjacent to delineated flood plains, shall be subject to the provisions of these regulations. As an example, all residential construction shall be elevated such that the lowest flood are no lower than 4 feet above the base flood elevation. Exceptions to this standard may be granted on appeal to the City Engineer based on a demonstration that the regulatory elevation is so conservative as to place an unreasonable burden upon developers or property owners.

For proposed developments located near small streams but where no base flood data or floodways have been provided or required under the Federal Flood Insurance Program or by Section 4.2 of these regulations, the following provisions apply:

1. No encroachments, including fill material and structures, shall be located within a minimum distance of 25 feet from the top of the stream bank on each side or 30 feet from the centerline of a stream channel, whichever is greater, unless certification by a registered engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
2. New construction or substantial improvements of residential structures shall have the lowest floor, including basement, elevated at least four (4) feet above the base flood elevation as determined by an appropriate approximate method.
3. New construction and substantial improvement of non-residential structures shall have the lowest floor, including basement, elevated at least 2 feet above the highest adjacent grade; or, together with attendant utility and sanitary facilities, be completely floodproofed to or above that level so that any space below that level is watertight, with walls substantially impermeable to the passage of water, and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy.



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4.6 Subdivision Standards

All subdivision projects shall meet the following provisions:

1. Design shall be consistent with the need to minimize flood damage.
2. Public utilities and facilities such as sewer, gas, electrical, and water systems shall be located and constructed to minimize flood damage.
3. Stormwater management facilities shall be provided to reduce exposure to flood hazards.
4. Base flood elevation and floodway data shall be provided as required in Section 4.2

4.7 Nonconforming Uses

The existing lawful use of a structure or premise that is not in conformity with the flood plain requirements of this manual may be continued subject to the following conditions:

1. No such use shall be expanded or enlarged except in conformity with the provisions of this manual.
2. No structural alterations, additions to, or repairs to any nonconforming structure over the life of the structure shall exceed 50 percent of its assessed value at the time of its becoming a nonconforming use unless permanently changed.
3. If such use is discontinued for 12 consecutive months, any future use of the building and premises shall conform to the provisions of this manual.
4. Uses or adjuncts thereof, which are nuisances, shall not be permitted to continue as nonconforming uses.
5. Any alteration, addition to, or repair to any nonconforming structure permitted shall be protected by floodproofing measures pursuant to Section 4.4.7.



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4.8 Dikes and Floodwalls

The design of dikes and floodwalls for flood protection purposes should consider several factors, including alternate compensating storage, possible surcharge in flood heights, overtopping, and failure.

Dikes are generally earth embankments that can extend sections of a building. Fill material used in their construction should be dredged from the flood plain to aid in providing compensating storage. The fill material shall be placed on cleared ground, compacted in layers, and protected from seepage. Buildings shall have a minimum setback from the base of the dike of 25 feet or twice the height of the embankment whichever is greater.

Floodwalls are preferred for locations with limited space and can be constructed as cantilever I-type steel piles, cellular walls, buttress walls, or gravity walls. They shall be well founded with cutoffs installed to prevent seepage. Areas located behind a dike or floodwall should be drained by conduits installed with automatic flap gates to prevent backflow, or by manually operated valves that are closed during flooding, or by a combination of these methods.

4.9 Buffers

New development and significant redevelopment in or adjacent to the flood plain and floodway shall include buffers in the proposed plans. The buffer along waterways will be an area where the surface is left in a natural state and is not disturbed by construction activity.

4.9.1 Buffer Areas Defined

The buffer shall be defined as follows:

1. In areas where a flood plain and floodway have been determined and shown on the latest FEMA Flood Insurance Rate Maps for the City of Mt. Juliet the buffer shall be the width of the floodway plus at least 50 feet perpendicular from the floodway on each side of the waterway.
2. In areas where a flood plain and floodway have not been determined and shown on the latest FEMA Flood Insurance Rate Maps for the City of Mt. Juliet, it contains a "blue line" or intermittent "blue line" stream denoted on the United States Geological Survey Quadrangle maps or serves a significant tributary area, of 40 or more acres, the buffer shall be at least 25 feet



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perpendicular from each side of the stream bank, creek or unnamed waterway under "bank full" conditions.

3. In areas where a flood plain and floodway have not been determined and it does not contain a "blue line" or intermittent "blue line" stream denoted on the United States Geological Survey Quadrangle maps or serves a significant tributary area of 40 or more acres, a buffer is not required.

4.9.2 Performance Criteria

The following additional performance criteria shall apply:

1. In order to maintain the functional value of the buffer area, indigenous vegetation may be removed only to provide for reasonable sight lines and vistas, provided that where removed they shall be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion, and filtering non-point source pollution from runoff.
 - a. Tree pruning or removal be minimized, but permitted as necessary to provide for sight lines and vistas, provided that where removed they shall be replaced with other vegetation that is equally effective in retarding runoff, preventing erosion, and filtering non-point source pollution from runoff.
 - b. Any path, for public or private use, shall be constructed and surface so as to effectively control erosion and minimize increases in excess stormwater runoff volume and velocity.
 - c. Dead, diseased, or dying trees or shrubbery may be removed at the distance of the landowner.
2. When the application of the buffer area would result in the extreme loss of buildable area, as defined by a 50 percent or greater loss on a lot or parcel, modifications to the width of the buffer area may be allowed by appeal through the City Engineer.



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Chapter 5

TECHNICAL GUIDELINES AND CRITERIA

5.1 Adequate Stormwater Management Systems

Adequate stormwater management systems shall have the hydraulic capacity to accommodate the maximum expected stormwater discharge for a specified tributary area and precipitation duration and intensity.

Adequate stormwater management systems shall be designed to accomplish the following:

1. Account for both offsite and onsite stormwater.
2. Maintain natural topographic divides.
3. Convey stormwater to a stream, natural channel, or other existing facility.
4. Discharge stormwater into the natural channel by connecting the channel at natural elevations, or by discharging the stormwater into an existing facility of sufficient capacity to receive it, or by discharging into an approved drainage well.
5. Limit or control stormwater quality leaving the site to predevelopment levels through the use of appropriate stormwater quality Best Management Practices.

Determination of the size and capacity of an adequate stormwater management system shall take into account the future development in the watershed or affected portions thereof. The design must not adversely affect adjacent or neighboring properties.

It is the responsibility of the developer or property owner to pick up or acceptably handle the quantity of runoff as it flows onto their property from the watershed above, and conduct it through the property to an adequate outfall at the lower property line or beyond. The outfall must be sufficient to receive the runoff without deterioration of the downstream channel.

The stormwater management system for new developments shall be designed to enhance stormwater quality for runoff, or a portion thereof, entering the property from the above watershed. New developments and areas of significant redevelopment are required to



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control stormwater quality for runoff from their site to predevelopment levels through the use of Best Management Practice. If it is not feasible to implement an on-site stormwater quality Best Management Practice then the developer may, with approval from the City Engineer, design a system that controls quality for an equivalent portion of runoff entering from the watershed above.

5.1.1 Minor Systems

The design of the minor stormwater management system shall be based on a storm frequency of 25 years. This criterion shall be applied on both closed conduit and open channel systems. However, if the 25-year design flow for an open channel system is greater than 100 cubic feet per seconds (cfs), then the open or closed system shall be capable of passing the 100-year design flow within the drainage easement. Systems relying on sinkholes or drainage wells for discharge shall be capable of passing the 100-year flow within the drainage easement.

In residential subdivision developments where the average lot size is less than 20,000 square feet, the following general guidelines shall be observed in the design of the minor system:

1. Design surface runoff across lots shall not have erosive velocities.
2. Quantities of surface runoff greater than 4 cfs that flow through lots shall be collected and conveyed in a system of open channels, closed conduits, or a combination of both.
3. Lots should generally be graded in such a manner that surface runoff does not cross more than three lots before it is collected in a system of open channels, closed conduits, or a combination of both. However, runoff will be permitted to cross more than three lots before it is collected if the system is designed to achieve stormwater quality benefit and does not pose a risk of erosion or other damage to public or private property. This may only be performed with approval from the City Engineer.

Design flows may be determined by acceptable methods.

5.1.2 Major Systems

Wherever possible, natural waterways serving the major system should remain undisturbed, with proposed development situated wisely accordingly. Detention may be required to avoid discharges that exceed the capacity of natural waterways.



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Channelization and other related modifications to the natural waterways are discouraged. Improvements to natural open channels that are to function primarily as the major system shall be designed to pass the 100-year design flow without damage to the channel. Man-made channels designed to function, as the major system (trunk line system), shall be capable of carrying a 100-year design flow. Where man-made channels are necessary, the channels should be located as far away from buildings or structures as possible and preferably in established greenways or other conservation corridors.

The onsite major stormwater management system for most developments is the natural backup system and consists of the less obvious drainage ways. Ideally, this major system should provide relief such that no building will be flooded with a 100-year design flow even if the minor system capacity is exceeded. The 100-year frequency storm shall be used to compute runoff for the design of the onsite major stormwater management system. This system shall be designed to provide relief for flow in excess of the 25-year design flow.

The following guidelines pertain to design of the onsite major stormwater management system:

1. Areas should be graded in such a manner or buildings located or constructed in such a manner that if the capacity of the minor system is exceeded; no building will be flooded by the design flow.
2. Critical areas to consider are sumps, relatively flat areas, and areas where buildings are located below streets or parking lots.
3. The 100-year frequency storm for the duration equivalent to the time of concentration shall be used to compute runoff for the major stormwater management system.
4. For the first trial, the same time of concentration values shall be used that were used in designing the minor stormwater management system and the minor system assumed to be completely inoperable. If no building will be flooded based on these assumptions, then the analysis can be considered complete.
5. If buildings will be flooded based on the assumptions used in the preceding item, more precise hydrologic and hydraulic computations are required. The minor system, overland relief swales, or surface storage should be designed so that flooding will damage no building.
6. In general, the minor stormwater management system should not be oversized as a basis for providing major system capacity. The major stormwater management system should be in the form of area grading or the location and construction of buildings in such a manner that overland relief swales or surface storage will provide adequate flood protection.



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The major stormwater management system should be evident on the drainage plan, including overland relief swales and areas that may be affected by surface storage for a 100-year design storm. Calculations performed for major system design should be submitted with the drainage plan.

5.2 Open Channels

5.2.1 Channel Capacity

Open channel capacity shall be determined by Manning's equation.

5.2.2 Lined Channels

Open channels may be designed as hard-armored, geosynthetic or soil bioengineering lined channels. Acceptable lining material must be placed in accordance with applicable subdivision regulations. Approval of lining materials is subject to review by the City Engineer.

Channel lining shall be required when the design velocity exceeds the allowable, non-erosive velocity for a given channel reach and no other erosion control measures provide adequate protection.

5.2.3 Grassed Channels

The design of grassed channels shall consider the variable degree of retardant generated by different types of cover.

Temporary erosion control shall be utilized during non-growing seasons and during grass cover establishment. The engineer shall not on the drawings or in the specifications that "All grassed channels must be in a well-established condition and show no sign of erosion at the time of final acceptance by the Mt. Juliet, DPW.



City of Mt. Juliet Stormwater Design Guidelines

5.2.4 Easement Width

All open channels shall be located within the right-of-way of a public utility and drainage easement. Minimum easement width shall be determined from Table 5-1.

Table 5-1 Minimum Easement Width for Open Channels	
<u>Top Width of Channel</u>	<u>Easement Width</u>
Less than 5 feet	10 feet
5-20 feet	10 feet greater than top width of channel, with minimum of 5 feet on one side
Greater than 20 feet	15 feet greater than top width of channel, with minimum of 5 feet on one side

5.3 Storm Pipes and Culverts

5.3.1 Conduit Capacity

Closed conduits shall be designed for the total flow intercepted by the inlets during the design storm event.

5.3.2 Pressure Flow

Storm drain system should generally be designed as non-pressure systems. However, pressure flow systems, if coordinated with the City Engineer during the preliminary design phase, may be allowed. The hydraulic gradient for pressure flow systems shall not exceed the following criteria:

1. An elevation greater than one foot below the established ground surface, or
2. More than five feet above the crown of the conduit.



City of Mt. Juliet Stormwater Design Guidelines

5.3.3 Easement Width

Minimum allowable easement width for stormwater pipes and culverts shall be determined from Table 5-2.

Table 5-2	
Minimum Easement Width for Storm Drains	
<u>Conduit Size</u>	<u>Easement Width</u>
15-18 inches	10 feet
21-33 inches	15 feet
36-48 inches	20 feet
54-72 inches	25 feet

5.3.4 Inlets

Inlets shall be designed to convey the 25-year frequency, time of concentration storm event.

5.3.5 Culverts

The design flow for culverts shall be based on the following return frequencies:

1. 100-year for residential collector and commercial road crossings.
2. 25-year for residential roads and crossings.

In addition, building elevations shall be checked for flooding caused by the 100-year, 24-hour storm.

5.4 Outlet Protection

The design discharge at the outlet of stormwater management systems shall not result in velocities that equal or exceed the erosive velocity of the receiving channel, unless energy dissipation and permanent erosion protection measures are placed at the outlet. Energy dissipation and erosion control devices shall have no overfall at the terminal end and shall discharge onto a stable section. The terminal section shall be considered stable if the terminal section design velocity is less than the erosive velocity.



City of Mt. Juliet Stormwater Design Guidelines

5.5 Bridges

All bridges shall be designed for the 100-year, 24-hour storm event. The design flow shall consider runoff from the total tributary area and will require stream channel routing, as appropriate. Design data and drawings shall be submitted with Infrastructure Plans.

5.6 Stormwater Quantity Detention

5.6.1 Release Rate

The release rate from any detention facility should approximate that of the site prior to the proposed development for the 2-year through 25-year storms, with emergency overflow capable of handling at least the 100-year discharge except where waived or altered by the City Engineer. Detention systems must be constructed during the first phase of major developments to eliminate damage to adjacent properties during construction. In this regard, the detention systems shall be designed to function as sediment traps and cleaned out to proper volumes before completion. If siltation has occurred, detention systems must be restored to their design dimensions after construction is complete and certified as part of the as-built submittal (see Section 2.3).

5.6.2 Detention Volume

The required detention volume shall be that volume necessary to attenuate the post-development peak discharge to a level not to exceed the pre-development peak discharge. This volume may be minimized by careful attention to outlet structure design.

5.6.3 Drawdown

Detention storage volume shall be drained within 72 hours. This requirement includes that volume above any permanent pool. Drawdown may be accomplished by a V-notch weir, perforated standpipe, small orifice, or complex geometry weir. A V-notch weir is preferred. Other methods may be approved, subject to review, by the City Engineer.

5.7 Stormwater Quality Detention and Retention

Stormwater quality management practices are to be applied to all new developments. They are intended to benefit stormwater quality by controlling frequent storm event flooding, erosion, and non-point pollutant loading. While detention practices are not required on all sites, due to land use, contributing area and other factors, they will most likely be necessary on larger sites.



City of Mt. Juliet Stormwater Design Guidelines

The stormwater quality systems are to be designed to “treat” the small frequent stormwater quality events and be designed to bypass all larger storm (flood events, unless the facility is designed to serve as both a stormwater quantity and quality management practice. The Project Engineer is responsible for selecting and sizing stormwater quality management practices with approval by the City Engineer.

5.7.1 Retention

Supportive data must be submitted to justify the type of detention facility selected. If the facility is designed to retain (volume control) all or significant portion of runoff, then appropriate soils analysis findings shall be submitted to the City Engineer. This submission shall also discuss the impacts the facility will have on local karst topography as found through a geological investigation of the site. The facility may be designed to infiltrate runoff to groundwater rather than transmit it downstream under conditions up to a 25-year storm event. It must be able to bypass all other storms up to a 100-year event with a discharge rate equivalent to or less than the pre-development conditions without negatively impacting the 100-year flood plain above or below the site. If data are not supportive that the facility can retain a significant portion of the runoff then the facility must be sized to detain runoff.

5.7.2 Dry and Wet Detention Design Criteria

All stormwater quality dry or wet detention facilities designs shall consider the following criteria:

1. Bleed down or “live” storage volume of the first 0.5 to 1.0 inches of runoff and residence time to 12 to 24 hours for dry ponds and 24 to 60 hours for wet ponds.
2. Permanent pond volume hydraulic residence time of 2 to 4 weeks.
3. Sediment forebay, baffle boxes or equivalent pretreatment device with high flow (25-year storm frequency or greater) bypass.
4. Length to width ration of at least 4:1.
5. Energy dissipating inlet structures.
6. Safe side slopes.
7. Oil and grease traps or floatable debris skimmers.
8. Maximum permanent pool depth of no more than 12 feet unless re-circulated with an aerator or fountain.
9. For wet ponds, a littoral zone of 10-30 percent pond coverage within 3 years of planting.
10. The City of Mt. Juliet strongly encourages that major stormwater quality controls, especially detention facilities, be designed as off-line devices.



City of Mt. Juliet Stormwater Design Guidelines

5.7.3 Emergency Overflow

The release rate from any stormwater quality detention facility should be as described above with emergency overflow capable of handling the 100-year discharge except where waived or altered by the City Engineer. An adequate alternate stormwater management system must be provided to accommodate major storm flows. Major stormwater quality controls must be constructed during the first phase of developments to eliminate damage to adjacent properties during construction.

5.7.4 Post Construction Detention Volume

The required detention volume shall be that volume necessary to attenuate the post-development runoff discharge volume to a level as described above. If siltation occurs during construction, the detention system must be restored to the original design dimensions after site construction is completed and certified as part of the as-built submittal (See Section 2.3).

5.8 Stormwater Detention/Retention Maintenance

Care must be taken to ensure that any required detention facilities do not become nuisances or health hazards. Stormwater quality management practices generally require more maintenance than stormwater quantity management practices. Detention facilities should be designed to require minimal maintenance, and maintenance responsibility must be clearly stated on the plans. Detention facilities may be designed to serve multiple purposes whereby runoff may be detained under wet-weather conditions, but also served as common or recreational areas during dry-weather conditions. Where multi-purpose facilities are provided, or where flat grades or poorly draining soils encountered, provisions for adequate low flow stormwater management system may be required. Where the retention/detention facility is planned to be used as a lake, pond, or stormwater quality management practice with a permanent pool; water budget calculations shall be performed and submitted to demonstrate that an adequate pool is expected during dry summer months.

All detention facilities located in residential developments shall be within public utility and drainage easements and shall be maintained by the appropriate Homeowner's Association. Detention facilities located in condominium developments, apartment or townhouse complexes, single family PUDs, industrial, commercial, or institutional developments shall be within public utility and drainage easements and maintained by the property owner or homeowner's association. A maintenance agreement must be executed and recorded before the development plan is approved.



City of Mt. Juliet
Stormwater Design Guidelines

5.9 Sinkholes and Drainage Wells

All stormwater management systems discharging to sinkholes or drainage wells shall be designed using the 100-year storm for the critical duration of the watershed tributary to the sinkhole or drainage well. A geologic investigation and report as described in Section 3.2.5 is required, along with a demonstration that development will not occur within the area flooded by the 100-year storm and that all state and federal permitting requirements are complied with.

5.10 Erosion Control Plans

An erosion control plan shall identify the erosion control practices and sediment trapping facilities, which are appropriate for the actual site conditions. In addition, the appropriate schedule of implementation shall be identified. Particular attention is required for concentrated stormwater flows. Either concentrated stormwater flows shall be avoided or the conveyance system shall be protected sufficiently to prevent significant erosion. Sediment trapping devices are required at all points where stormwater leaves a site laden with sediment. The plan shall identify provisions including, but not limited to, the following:

1. Erosion prevention on denuded areas.
2. Non-structural management practices to be implemented.
3. Perimeter controls.
4. Permanent stormwater conveyance structures.
5. Final stabilized conditions of the site.
6. Provisions for removing temporary control measures.
7. Stabilization of the site where temporary measures are removed.
8. Maintenance requirements for temporary management practices including minimum inspection requirements.
9. Maintenance requirements for any permanent measures.

5.10.1 Stabilization of Denuded Areas and Soil Stockpiles

Permanent or temporary soil stabilization shall be applied to denuded areas within 15 days after final grade is reached on any portion of the site. Soil stabilization shall also be applied within 15 days to any portion of denuded areas, which may not be at final grade, but will remain dormant (undisturbed) for longer than 60 days.

Soil stabilization refers to measures that protect soil from the erosive forces of raindrop impact and flowing water. Applicable practices include, but are not limited to, vegetative



City of Mt. Juliet Stormwater Design Guidelines

establishment, mulching, and the early application of gravel base on areas to be paved. Selected soil stabilization measures should be appropriate for the time of year, site conditions, and estimated duration of use.

Soil stockpiles shall be stabilized if left undisturbed for 15 or more days. They shall be protected with sediment trapping measures that may include sediment traps or detention ponds to prevent soil loss from the project site throughout the life of the soil stockpiling practices.

5.10.2 Establishment of Permanent Vegetation

A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved which, in the opinion of the City Engineer, is mature enough to control soil erosion satisfactorily and to survive severe weather conditions.

5.10.3 Protection of Adjacent Properties

Properties adjacent to the site of a land disturbance shall be protected from sediment deposition. This may be accomplished by preserving a well-vegetated buffer strip around the lower perimeter of the land disturbance; by installing perimeter controls such as sediment barriers, filters, diversion berms, or sediment basins; or by a combination of such measures.

Vegetated buffer strips may be used alone only where runoffs in sheet flow if expected. Buffer strips should be at least 25 feet in width. If at any time it is found that a vegetated buffer strip alone is ineffective in stopping sediment movement onto adjacent property, additional perimeter controls shall be required.

5.10.4 Timing and Stabilization of Sediment Trapping Measures

Sediment basins and traps, perimeter berms, sediment, barriers, and other measures intended to trap sediment onsite shall be constructed as a first step in grading, and be made functional before upslope land disturbance takes place. All sediment control practices at hydraulic outlets from the site must be installed before additional construction may take place. See Section 2.2.2 of this volume. Earthen structures such as dams, dikes, and diversions shall be seeded and mulched within 15 days of installation.

5.10.5 Sediment Basins

Stormwater runoff from tributary areas with 5 acres or greater disturbed area shall pass through a sediment basin or other suitable sediment trapping facility.



City of Mt. Juliet Stormwater Design Guidelines

5.10.6 Cut and Fills Slopes

Cut and fill slopes shall be designed and constructed in a manner which will minimize erosion. Consideration must be given to the length and steepness of the slope, the soil type, upslope tributary area, groundwater conditions, and other applicable factors. As a minimum, all slopes at 3 to 1 or greater shall be stabilized with rock riprap, geosynthetic material, or other method approved by the City Engineer.

5.10.7 Construction Exits

A stabilized stone pad shall be placed at any point where traffic will be leaving a construction site to a public right-of-way, street, alley, sidewalk, or parking lot. Stone pads shall contain ASTM-1 stone, six (6) inches thick, and be a minimum of one hundred (100) feet long.

5.10.8 Deficient Performance

If at any time it is determined by the Department of Public Works, the property owner or designated construction site inspector/manager that the erosion prevention and sediment control practices as originally designed are not capable of preventing sediment from leaving the site under storm conditions, then additional controls shall be implemented. Additional controls shall be implemented to a level and until a time in which the City Engineer is satisfied that the controls are adequate. If Mt. Juliet, DPW inspectors determine that adequate inspections and maintenance procedures are not being implemented or the controls designed are not meeting performance objectives presented in this chapter then the Mt. Juliet, DPW may issue a Stop Work Order, rescind a grading permit, or take other appropriate legal action. See Section 2.1 of these regulations.

5.11 GUTTER AND INLET HYDRAULICS

SYNOPSIS

The level of service of facilities that provide drainage of roadway surfaces should be consistent with the level of service of the roadway. Guidelines are given for evaluating roadway features and design criteria as they relate to gutter and inlet hydraulics. Procedures for performing gutter flow calculations are based on a modification of Manning's Equation. Inlet capacity calculations for grated and combination inlets are based on information contained in HEC-12 (USDOT, FHWA, 1984). City of Mt. Juliet specific design information is presented for typical details contained in the Standard Drawings of the City of Mt. Juliet, Public Works Department.

DESIGN CRITERIA

The following design criteria are typically important for gutter and inlet capacity calculations:

1. Return period
2. Spread
3. Inlet types and spacing
4. Manning's n values
5. Grade
6. Cross slope
7. Curb and gutter sections
8. Roadside and median ditches
9. Bridge decks

5.11.1 RETURN PERIOD

The design storm return period for pavement drainage should be consistent with the frequency selected for other components of the drainage system.

5.11.2 SPREAD

For multi-laned curb and gutter or guttered roadways with no parking, it is not practical to avoid travel lane flooding when grades are flat (1.0) percent). However, flooding should never exceed the lane adjacent to the gutter (or shoulder) for design conditions. Standard practice in Mt. Juliet is to limit maximum stormwater spread to 8 feet, measured from the face of the curb. Municipal bridges with curb and gutter should also use this criterion. For single-lane roadways, at least 8 feet of roadway should remain unflooded for design conditions.

5.11.3 INLET TYPES AND SPACING

Inlet types shall be selected from Standard Drawing DR-105, DR-110, and DR-115 of the City of Mt. Juliet Public Works Department Standard Drawings. Inlets shall be located or spaced in such a manner that the design curb flow does not exceed the spread criterion of 8 feet.

No flow will be allowed to cross intersecting streets unless approved by the City of Mt. Juliet Department of Public Works. In addition, curb and gutter inlets should not be built in curb returns.

5.11.4 MANNING'S n VALUES

Manning's n values for various pavement surfaces are presented in Table 5.3.

5.11.5 GRADE

Curb and gutter grades that are equal to pavement slopes shall not exceed 13 percent or fall below 1 percent without approval from the Mt. Juliet Department of Public Works. A minimum longitudinal gradient is more important for curbed pavements, which are susceptible to stormwater spread. Flat gradients on uncurbed pavements can lead to a spread problem if vegetation is allowed to build up along the pavement edge.

5.11.6 CROSS SLOPE

The design of pavement cross slope is often a compromise between the need for reasonably steep cross slopes for drainage and relatively flat cross slopes for driver comfort. In most Mt. Juliet design situations, cross slopes will be defined by the standard pavement sections given on Standard Drawings ST-101, ST-102, ST-105, ST-106, ST-108, ST-109, ST-111, and ST-112 of the City of Mt. Juliet, Public Works Department Standard Drawings for Streets and Roads. The standard City of Mt. Juliet cross slope is a 4-inch crown over the edge of the pavement.

When three or more lanes are inclined in the same direction on multi-lane pavements, it is desirable for each successive pair of lanes, or the portion thereof outward from the first two lanes from the crown line, to have an increased slope. The two lanes adjacent to the crown line should be pitched at the normal slope, and successive lane pairs, or portions thereof outward, should be increased by about 0.5 to 1.0 percent. Where three or more lanes are provided in each direction, the maximum pavement cross slope should be limited to 4 percent.

5.11.7 CURB AND GUTTER SECTIONS

Curbing at the outside edge of pavements is normal practice for low-speed, urban highway facilities. Curb and curb and gutter details are presented in Standard Drawings ST-200, ST-202, ST-203, and ST-204 of the City of Mt. Juliet, Public Works Department

Standard Drawings. Standard gutter width is as shown on the details. Gutters are on the same cross slope as the pavement on the high side and depressed with a steeper cross slope on the low side, usually 1 inch per foot. Typical practice is to place curbs at the outside edge of shoulders or parking lanes on low speed facilities.

5.11.8 ROADSIDE AND MEDIAN DITCHES

Roadside ditches are commonly used with uncurbed roadway sections to convey pavement runoff and upgradient area runoff that drains toward the pavement. Right-of-way limitations prevent use of roadside ditches in densely developed urban areas. They can be used in cut sections, depressed sections, and other locations where sufficient right-of-way is available and driveways or intersections are infrequent. Curbed highway sections are relatively inefficient at conveying water, and the area tributary to the gutter section should be kept to a minimum to reduce the hazard from water on the pavement. Where practicable, the flow from major areas draining toward curbed highway pavements should be intercepted by ditches as appropriate.

It is preferable to slope median areas and inside shoulders to a center swale, to prevent drainage from the median areas from running across the pavement. This is particularly important for high-speed facilities and for facilities with more than two lanes of traffic in each direction.

5.11.9 BRIDGE DECKS

Drainage of bridge decks is similar to other curbed roadway sections. It is often less efficient, because cross slopes are flatter, parapets collect large amounts of debris, and small drainage inlets on scuppers have a higher potential for clogging by debris. Bridge deck constructibility usually requires a constant cross slope, so the guidelines in Section 5.11.6 do not apply. Because of the difficulties in providing and maintaining adequate deck drainage systems, gutter flow from roadways should be intercepted before it reaches a bridge. In many cases, deck drainage must be carried several spans to the bridge end for disposal.

Zero gradients and sag vertical curves should be avoided on bridges. The minimum desirable grade for bridge deck drainage should be 1.0 percent. When bridges are placed at a vertical curve and the grade is less than 1.0 percent, the gutter spread should be checked to ensure a safe, reasonable design.

Scuppers are the recommended method of deck drainage, because they can reduce the problems of transporting a relatively large concentration of runoff in an areas of generally limited right-of-way. They also have a low initial cost and are relatively easy to maintain. However, the use of scuppers should be evaluated for site-specific concerns. Scuppers should not be located over embankments, slope pavement, slope protection, navigation channels, driving lanes, or railroad tracks. Runoff collected and transported to the end of the bridge should generally be collected by inlets and down drains, although sod flumes may be used for extremely minor flows in some areas.

5.11.10 GUTTER FLOW CALCULATIONS

The following form of Manning's Equation should be used to evaluate gutter flow hydraulics:

$$Q = \frac{0.56}{n} S_x^{5/3} S^{1/2} T^{8/3} \quad (5-1)$$

where:

Q = Gutter flow rate, in cfs

n = Manning's roughness coefficient

S_x = Pavement cross slope, in feet/foot

S = Grade, in feet/foot

T = Width of flow or spread, in feet

Nomographs for solving Equation 5-1 are presented in other technical literature.

Table 5.3

MANNING'S n VALUES FOR STREET AND PAVEMENT GUTTERS

<u>Type of Gutter or Pavement</u>	<u>Manning's n</u>
Design value for Mt. Juliet	0.014
Concrete gutter, troweled finish	0.012
Asphalt pavement	
Smooth texture	0.013
Rough texture	0.016
Concrete gutter with asphalt pavement	
Smooth	0.013
Rough	0.015
Concrete pavement	
Float finish	0.014
Broom finish	0.016
For gutters where sediment may accumulate, Increase values of n by	0.002

Reference: USDOT, FHWA, HDS 0 3 (1961).



City of Mt. Juliet
Stormwater Design Guidelines

Appendix C.1

Checklist

Appendix C.1

CHECKLIST

	Included	Not Applicable
1. "Plans Submittal Information" forms. Plans will not be accepted for review without the form completed.	<input type="checkbox"/>	
2. Tennessee General Storm Water Permit Certification form certifying that Notice of Intent (NOI) has been submitted to the Tennessee Department of Environment and Conservation (TDEC) for a permit for construction site runoff. Include the permit number or intent to submit the number at a later date or that a permit is not required.	<input type="checkbox"/>	
3. Three (3) copies of grading, stormwater management, and erosion control plans on a scale of no less than 1" (one inch)=100' (one hundred feet)	<input type="checkbox"/>	
4. Property Map and Parcel Number	<input type="checkbox"/>	
5. Existing and proposed site contours at an interval no greater than two (2) feet.	<input type="checkbox"/>	<input type="checkbox"/>
6. Existing and proposed buildings on the property.	<input type="checkbox"/>	<input type="checkbox"/>
7. Existing and proposed paving on the property.	<input type="checkbox"/>	<input type="checkbox"/>
8. Existing and proposed stormwater management structures on and in the immediate vicinity of the property. Must include the location, size, and capacity of the next two structures immediately downstream in every direction what will receive runoff. Must include size, type, slope, and invert elevation of the structures.	<input type="checkbox"/>	<input type="checkbox"/>
9. At least one benchmark located, with the proper elevation indicated (NGCD to be used exclusively)	<input type="checkbox"/>	<input type="checkbox"/>
10. Place ASTM-1 Stone on all construction entrances. Pad shall be 6-inches thick and 100-feet long.	<input type="checkbox"/>	<input type="checkbox"/>
11. Temporary erosion and sediment control measures to be implemented during construction.	<input type="checkbox"/>	<input type="checkbox"/>
12. Final stabilization measures proposed for all disturbed areas on the property. Areas with a slope greater than 3:1 must be stabilized by methods approved by the City Engineer.	<input type="checkbox"/>	<input type="checkbox"/>
13. Stormwater management system design calculations based on 25-year design storm for minor system and 100-year design for major system. Calculation should be for pipes and ditches as well as areas where the runoff sheet flows.	<input type="checkbox"/>	<input type="checkbox"/>

		Included	Not Applicable
14.	Stormwater quantity detention designs calculations, for detaining the 2-year, 5-year, 10-year, and 25-year storms and evaluates the effects of the 100-year storm. If a pond is overtopped by the 100-year storm, provide details of an emergency overflow device.	<input type="checkbox"/>	<input type="checkbox"/>
15.	Stormwater quality detention designs for detaining the "stormwater quality design event".	<input type="checkbox"/>	<input type="checkbox"/>
16.	Flood plain and floodway boundaries, stream buffer zones and the flood plain elevations.	<input type="checkbox"/>	<input type="checkbox"/>
17.	Cut and fill cross-sections and volume calculations.	<input type="checkbox"/>	<input type="checkbox"/>
18.	First floor elevations for building in and adjacent to the flood plain.	<input type="checkbox"/>	<input type="checkbox"/>
19.	Detail drawings of swales, ditches, inlets, head walls, detention pond outlet structures and overflows, erosion control measures, etc.	<input type="checkbox"/>	<input type="checkbox"/>
20.	Delineation of wetlands or other environmentally sensitive areas.	<input type="checkbox"/>	<input type="checkbox"/>
21.	Three (3) copies of sinkhole and drainage well information, if applicable to the site conditions.	<input type="checkbox"/>	<input type="checkbox"/>
22.	Subdivision plans should include typical roadway pavement section and plan and profile or proposed roadways. The plan must also meet all requirements of the Subdivision Specifications and Regulations.	<input type="checkbox"/>	<input type="checkbox"/>
23.	Proposed construction schedule if greater than twelve months.	<input type="checkbox"/>	<input type="checkbox"/>
24.	Plan must be stamped by a registered engineer or registered landscape architect if applying for a grading permit.	<input type="checkbox"/>	<input type="checkbox"/>
25.	Plan must be stamped by a registered engineer if applying for a building permit.	<input type="checkbox"/>	<input type="checkbox"/>

Some requirements will not be applicable to all plans, depending on the permit being requested. Omissions of any of the heretofore-mentioned requirements for detailed plans shall deem these plans as being incomplete, and shall be returned to the Developer, or designated Engineer, for completion before review.

APPENDIX C.2

Tennessee General Construction Storm Water Permit Certification

Tennessee General Construction Storm Water Permit Certification
Mt. Juliet
Department of Public Works

Please fill out and sign/date one of the following two statements:

1. The project associated with these submitted plans is covered under Tennessee General Storm Water Permit TN _____.

Signature Date

Circle one: Developer Project Engineer Other _____

(If an NOI has been submitted to the State for this project, its assigned permit number can be acquired by calling the Tennessee Division of Water Pollution Control at 532-0667 or 532-0645.)

Note: Plans may be submitted without the above permit number, however, no grading permit shall be released until the project's State General Storm Water permit number is submitted.

If you intend to submit the permit number at a later date, please check here. _____

2. I hereby certify that this project does not require coverage under a Tennessee General Storm Water Permit.

Signature Date

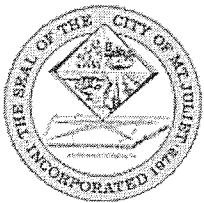
Circle one: Developer Project Engineer Other _____

Note: Projects of five or more acres require permit coverage, while projects of less than five acres do not require permit coverage. Also, projects of less than five acres that are part of a total development project of five or more acres require permit coverage.

(If you are unsure whether your particular project requires coverage under a Tennessee General Storm Water Permit, please call the Tennessee Division of Water Pollution Control at 650-7273).

Appendix C.3

Stormwater Detention Maintenance Agreement



STORM WATER DETENTION AGREEMENT

Map No: _____ Parcel No: _____

THIS AGREEMENT, made to and entered into this _____ day of _____, of the year, _____, by and between _____ (hereinafter called the "Land Owner") and The City of Mt. Juliet, (hereinafter called "The City").

WITNESSETH, that

WHEREAS The City of Mt. Juliet has adopted and approved certain technical guidelines relating to the policy on detention of storm water in the City of Mt. Juliet; and

WHEREAS, the Land Owner is the owner of certain real property, more particularly described as

as recorded by Deed in the land records of Wilson County, Tennessee in Deed Book _____,

Page _____, Pond No. 1 Out-Fall Structure GPS (NAD-88) Latitude: _____,

Longitude: _____, Pond No. 2 Out-Fall Structure GPS(NAD-88) Latitude: _____,

Longitude: _____ (hereinafter called the "Property"); and

WHEREAS, the Land Owner is proceeding to build on and develop the property; and

WHEREAS, the Site Plan/Subdivision Plan, _____, prepared by _____,

dated _____, on file at the City of Mt. Juliet (hereinafter called the "Plan"),

which is expressly made a part hereof, as approved or to be approved by The City, provides for detention of storm water within the confines of the property; and

WHEREAS, The City and the Land Owner agree that the health, safety, and general welfare of the residents of the City of Mt. Juliet require that onsite storm water detention facilities be constructed and maintained on the property; and

WHEREAS, The City requires that onsite storm water facilities as shown on Plan _____ be constructed and adequately maintained by the Land Owner;

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The Land Owner in accordance with the plans and specifications identified in the Plan shall construct the onsite storm water detection facilities.
2. The Land Owner shall maintain the storm water detection facilities as shown on Plan _____ in good working order acceptable to The City, and in accordance with the required program elements and other conditions set forth in the Tennessee small MS4 General Permit effective July 7, 2003.
3. The Land Owner hereby grants permission to The City, its authorized agents, and employees to enter the property and to inspect the storm water detection facilities whenever it deems necessary. Whenever possible, The City shall notify the Land Owner prior to entering the property.
4. In the event, the Land Owner fails to maintain storm water detection facilities as shown on Plan _____ in good working order acceptable to The City, The City may enter the property and take whatever steps it deems necessary to maintain said storm water detention facilities. This provision shall not be construed to allow The City to erect any structure of a permanent nature on the land of the Land Owner without first obtaining written approval of the Land Owner. It is expressly understood and agreed that The City is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on The City.
5. In the event, The City, pursuant to this Agreement, performs work of any nature, or expands any funds in the performance of said work for labor, use equipment, supplies, materials, and the like, the Land Owner shall reimburse The City upon demand, within ten (10) days of receipt thereof for all costs incurred by The City.

6. It is the intent of this Agreement to insure the proper maintenance of onsite storm water detection facilities by the Land Owner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of any party for damage alleged to result from or be caused by storm water management.
7. The Land Owner, its executors, administrators, assigns, and any other successors in interest, shall indemnify and hold The City and its agents and employees harmless for any and all damages, accidents, casualties, occurrence, or claims which might arise or be asserted against The City from the construction, presence, existence, or maintenance of the storm water detection facilities by the Land Owner or The City.
8. In the event a claim is asserted against The City, its agents, or employees, The City shall notify the Land Owner, and the Land Owner shall defend at his own expense any suit based on such claim. If the judgment or claims against The City, its agent, or employees shall be allowed, the Land Owner shall pay all costs and expenses in connection therewith.
9. This Agreement shall be recorded among the land records of Wilson County, and shall constitute a covenant running with the land, and shall be binding of the Land Owner, its administrators, executors, assigns, heirs, and any other successors in interest.

WITNESS the following signatures and seals:

The City of Mt. Juliet

Developer

By: _____
Director of Public Works

By: _____
Authorized Agent of Development

ATTEST:

Date: _____

Prepared by:

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, of the year _____, do certify that _____ whose names are signed to the foregoing Agreement bearing the date of the _____ day of _____, of the year _____, have acknowledged the same before me in my said County and State aforesaid.

GIVEN under my hand this _____ day of _____, of the year _____,

Notary Public

STATE OF TENNESSEE)
)
COUNTY OF WILSON)

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, of the year _____, do certify that _____ Director of Public Works, whose name is signed to the foregoing Agreement bearing the date of _____ day of _____, of the year _____, has acknowledged the same before me in said County and State aforesaid.

GIVEN under my hand this _____ day of _____, of the year _____,

Notary Public



STORM WATER MAINTENANCE AGREEMENT (WATER QUALITY ONLY)

Map No: _____ Parcel No: _____

THIS AGREEMENT, made to and entered into this _____ day of _____, of the year, _____, by and between _____ (hereinafter called the "Land Owner") and The City of Mt. Juliet, (hereinafter called "The City").

WITNESSETH, that

WHEREAS The City of Mt. Juliet has adopted and approved certain technical guidelines relating to the policy on storm water quality management in the City of Mt. Juliet; and

WHEREAS, the Land Owner is the owner of certain real property, more particularly described as

as recorded by Deed in the land records of Wilson County, Tennessee in Deed Book _____, Page _____, Pond No. 1 Out-Fall Structure GPS (NAD-83) Latitude: _____, Longitude: _____, Pond No. 2 Out-Fall Structure GPS(NAD-83) Latitude: _____, Longitude: _____ (hereinafter called the "Property"); and

WHEREAS, the Land Owner is proceeding to build on and develop the property; and

WHEREAS, the Site Plan/Subdivision Plan, _____, prepared by _____, dated _____, on file at the City of Mt. Juliet (hereinafter called the "Plan"), which is expressly made a part hereof, as approved or to be approved by The City, provides for storm water quality management within the confines of the property; and

WHEREAS, The City and the Land Owner agree that the health, safety, and general welfare of the residents of the City of Mt. Juliet require that onsite storm water quality management facilities be constructed and maintained on the property; and

WHEREAS, The City requires that onsite storm water facilities as shown on Plan _____ be constructed and adequately maintained by the Land Owner;

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The Land Owner in accordance with the plans and specifications identified in the Plan shall construct the onsite storm water quality management facilities.
2. The Land Owner shall maintain the storm water quality management facilities as shown on Plan _____ in good working order acceptable to The City, and in accordance with the required program elements and other conditions set forth in the Tennessee small MS4 General Permit effective July 7, 2003.
3. The Land Owner hereby grants permission to The City, its authorized agents, and employees to enter the property and to inspect the storm water quality management facilities whenever it deems necessary. Whenever possible, The City shall notify the Land Owner prior to entering the property.
4. In the event, the Land Owner fails to maintain storm water quality management facilities as shown on Plan _____ in good working order acceptable to The City, The City may enter the property and take whatever steps it deems necessary to maintain said storm water quality management facilities. This provision shall not be construed to allow The City to erect any structure of a permanent nature on the land of the Land Owner without first obtaining written approval of the Land Owner. It is expressly understood and agreed that The City is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on The City.
5. In the event, The City, pursuant to this Agreement, performs work of any nature, or expands any funds in the performance of said work for labor, use equipment, supplies, materials, and the like, the Land Owner shall reimburse The City upon demand, within ten (10) days of receipt thereof for all costs incurred by The City.

6. It is the intent of this Agreement to insure the proper maintenance of onsite storm water quality management facilities by the Land Owner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of any party for damage alleged to result from or be caused by storm water management.
7. The Land Owner, its executors, administrators, assigns, and any other successors in interest, shall indemnify and hold The City and its agents and employees harmless for any and all damages, accidents, casualties, occurrence, or claims which might arise or be asserted against The City from the construction, presence, existence, or maintenance of the storm water quality management facilities by the Land Owner or The City.
8. In the event a claim is asserted against The City, its agents, or employees, The City shall notify the Land Owner, and the Land Owner shall defend at his own expense any suit based on such claim. If the judgment or claims against The City, its agent, or employees shall be allowed, the Land Owner shall pay all costs and expenses in connection therewith.
9. This Agreement shall be recorded among the land records of Wilson County, and shall constitute a covenant running with the land, and shall be binding of the Land Owner, its administrators, executors, assigns, heirs, and any other successors in interest.

WITNESS the following signatures and seals:

The City of Mt. Juliet

Developer

By: _____
Director of Public Works

By: _____
Authorized Agent of Development

ATTEST:

Date: _____

Prepared by:

I, _____, a Notary Public in and for the County
and State aforesaid, whose commission expires on the _____ day of _____, of
the year _____, do certify that _____ whose names are
signed to the foregoing Agreement bearing the date of the _____ day of _____,
of the year _____, have acknowledged the same before me in my said County and State
aforesaid.

GIVEN under my hand this _____ day of _____, of the year _____,

Notary Public

STATE OF TENNESSEE)
)
COUNTY OF WILSON)

I, _____, a Notary Public in and for the County
and State aforesaid, whose commission expires on the _____ day of _____, of
the year _____, do certify that _____ Director of Public
Works, whose name is signed to the foregoing Agreement bearing the date of _____ day of
_____, of the year _____, has acknowledged the same before me in said
County and State aforesaid.

GIVEN under my hand this _____ day of _____, of the year _____,

Notary Public

Appendix C.4

City of Mt. Juliet NPDES Permit



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243-1534

July 7, 2003

Mr. Rob Shearer
City of Mount Juliet, City Manager
2425 N. Mt. Juliet Road
Mt. Juliet, TN 37121

Subject: NPDES Permit Tracking No. TNS075451
Mount Juliet MS4

Dear Mr. Shearer:

The Mount Juliet municipal separate storm sewer system (MS4) is hereby covered under the Tennessee phase II MS4 general permit. Enclosed in this package should be a copy of your notice of coverage (NOC) and a complete copy of the permit (29 pages). We are issuing coverage under the permit in response to your notice of intent (NOI) received by us on March 27, 2003, and reviewed by our local office in Nashville and the Permit Section in Nashville.

The permit requires that you begin implementing six storm water management measures. You must submit annual reports each year, beginning September 30, 2004, reporting on implementation of these programs. We point out two items, which especially affect ordinances, staff training and budgeting:

- a. you must ensure that certain ordinances be in place by December 31, 2004; the persons involved in reviewing and approving ordinances will need education on these issues and need time to review the ordinances; and
- b. to implement the construction site runoff control program by December 31, 2005, your staff must be trained in review of erosion prevention and sediment control plans and inspection and enforcement protocol; you may need additional staff for this program.

You may access the permit in electronic format and find links to various compliance assistance resources by visiting our web page at <http://www.state.tn.us/environment/wpc/stormh2o/MS4II.php>.

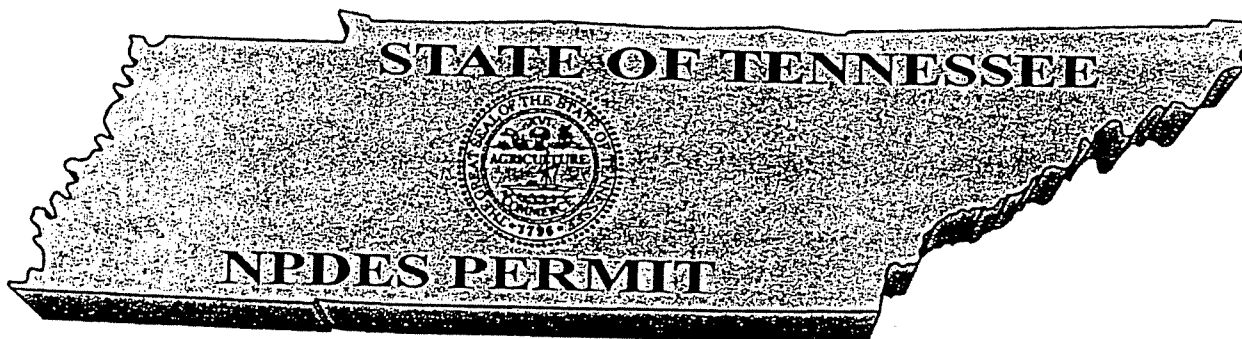
If you have questions, please contact the Division of Water Pollution Control at your local Environmental Assistance Center at 1-888-891-TDEC; or, at this office, please contact Mr. Jim McAdoo at (615) 532-0684 or by E-mail at Jim.McAdoo@state.tn.us.

Sincerely,

A handwritten signature in cursive script, reading "Saya Ann Qualls", is written over the "Sincerely," line.

Saya Ann Qualls, P.E.
Manager, Permit Section
Division of Water Pollution Control

cc: Division of Water Pollution Control, Permit Section
Division of Water Pollution Control, Environmental Assistance Center - Nashville



NPDES GENERAL PERMIT FOR DISCHARGES
From
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM

Tracking No. TNS075451

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.) and approval from the United States Environmental Protection Agency under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 (33 U.S.C. 1251, et seq.) and the Water Quality Act of 1987, P.L. 100-4, the following operator of a small municipal separate storm sewer system is authorized to discharge storm water runoff into the waters of the State of Tennessee in accordance with the various eligibility criteria, administrative procedures, program requirements, reporting requirements, etc. set forth in parts 1 through 7 of Tennessee small municipal separate storm sewer system NPDES general permit, issued February 27, 2003:

Discharger: **City of Mount Juliet**

is authorized to discharge: storm water runoff

from the Mount Juliet separate storm sewer system located in: Wilson County

to waters of the state, in accordance with the required program elements and other conditions set forth in the Tennessee small MS4 general permit:

Coverage under this general permit shall become effective on: **July 7, 2003**

and shall expire on **February 26, 2008.**

Notice of Coverage issued: **July 3, 2003**

Paul E. Davis, Director
Division of Water Pollution Control

NPDES General MS4 Permit is located at <http://TDEC: Water Pollution Control MS4 Phase II>